

NISTTech

Electron Spin Resonance Spectrometer and Method For Using Same

The HD-ESR spectrometer utilizes a superior detection scheme to perform electron spin resonance measurements. The major innovation associated with the HD-ESR spectrometer centers on the use of a shorted coaxial "probe" to excite the sample under test using near-field microwave radiation. This approach allows for a scalable effective probe volume which greatly enhances the fill factor and consequently, the sensitivity (theoretically providing 10 orders of magnitude sensitivity improvement compared to conventional spectrometers). Another innovation is the use of a donut-shaped, small permanent magnet to create a highly uniform magnetic field for the very small probe. This greatly simplified experimental arrangement lends itself to "scanning" the HD-ESR probe across a sample producing spectroscopic and spatially determined atomic-scale defect information.

Description

ESR (Electron Spin Resonance) spectrometers are used as an analytical technique for substance samples in physics, biology, medicine, etc. This is assuming that the substance sample has one or more unpaired electrons.

Applications

- **Diverse**
Analytical technique that can be used in fields such as biology, medicine, physics, and chemistry

Advantages

- **Shortened coaxial probe**
will enhance fill factor, as well as sensitivity
- **Small donut shaped permanent magnet**
will allow atomic scaled defect information
- **Reduced cavity volume**
allows improved sensitivity

Abstract

The HD-ESR spectrometer has a superior detection design in comparison to other designs. Examples of change to previous design are shortened coaxial "probe", or the use of a small, donut shaped permanent magnet. These modifications allow the HD-ESR spectrometer to perform better ESR measurements.

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References

- Serial No. 14/244,494, Filed on 4/3/2014

Status of Availability

This invention is available for licensing exclusively or non-exclusively in any field of use.

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